REMARKS

Applicant thanks the Examiner for his very careful review of the Application. Extensive amendments have been made to the notation in the specification, claims and abstract to improve consistency, to address many of the issues raised in the Official Action and to clarify the discussion of pseudo-variable quantization. Revised drawings are enclosed together with original Fig. 3 red-lined to show the changes. It is believed that the line quality of Fig. 2 is sufficiently bold for an informal drawing but if the Examiner requires a new Fig. 2 as well, Applicant will be happy to provide same.

Objections to the Specification:

2.a) The notation has been modified to denote the reconstructed $Y[m,n]$ as $Z[m,n]$.

2.b) The formula on page 8, line 25 has been corrected.

2.c) Revisions of the notation have corrected the notation of T_{ijm}.

2d. On page 14, the convolution formula has been corrected.

Objections to the Claims:

3.a) The division by $S_{min}Q$ has been corrected to $Y_i[m,n]/(S_{min}Q[m,n])$ in accord with the Examiner's comments.

3.b) The typographical errors in the formula for A_{mn} have been corrected.

3.c & d) The formula in claim 7 for S_{ij} and the expression $Q*S_{min}$ have been corrected.

3.e) The numbering in claim 8 has been corrected.

3.f) The terminology in claims 8 and 9 has been revised.

Rejections under 35 U.S.C. 112(2):

The objection to ``said Q'' has been met by using the words ``global quantization matrix Q'' instead.

Rejections under 35 U.S.C. 103(a):

JPEG Part 3 (ISO/IEC 10918-3), approved in 1995, defines extensions to the JPEG standard that allow for variable quantization. Unfortunately, these extensions are not supported by most applications (including most web browsers, and the IJG reference implementation).

US Patent No. 6,314,208 entitled ``System for variable quantization in JPEG for compound documents'' describes a system for determining variable quantization local scaling factors using a block classifier that separates text and picture information. This algorithm effectively employs variable quantization but requires the use of extensions only introduced in JPEG Part 3.

Similarly, US Patent Application No. 2001/0043754 describes a method for determining local scaling factors based on perceptual classification performed in the spatial domain. This algorithm also presupposes use of JPEG Part 3 extensions.
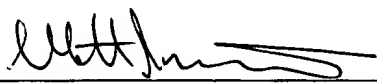'' JPEG Part 3 defines extensions to the JPEG Standard that allow for variable quantization, but these extensions are not supported by most applications (including web browsers, and the IJG reference implementation.

Konstantinides et al. describes a system for determining variable quantization local scaling factors using a block classifier that separates text and picture information. This algorithm effectively employs variable quantization but requires the use of extensions introduced only in JPEG Part 3. Applicant produces a valid JPEG Part 1 file, whereas the prior art relies on Part 3 extensions to the standard.

Applicant employs a pseudo-variable quantization scheme which has been introduced into claim 1 (element(e)). Such a technique is not shown in the references cited.

Accordingly, Applicant solicits favourable re-consideration of the application herein.

Respectfully submitted

Reg. No. 43,851

40— START (image)
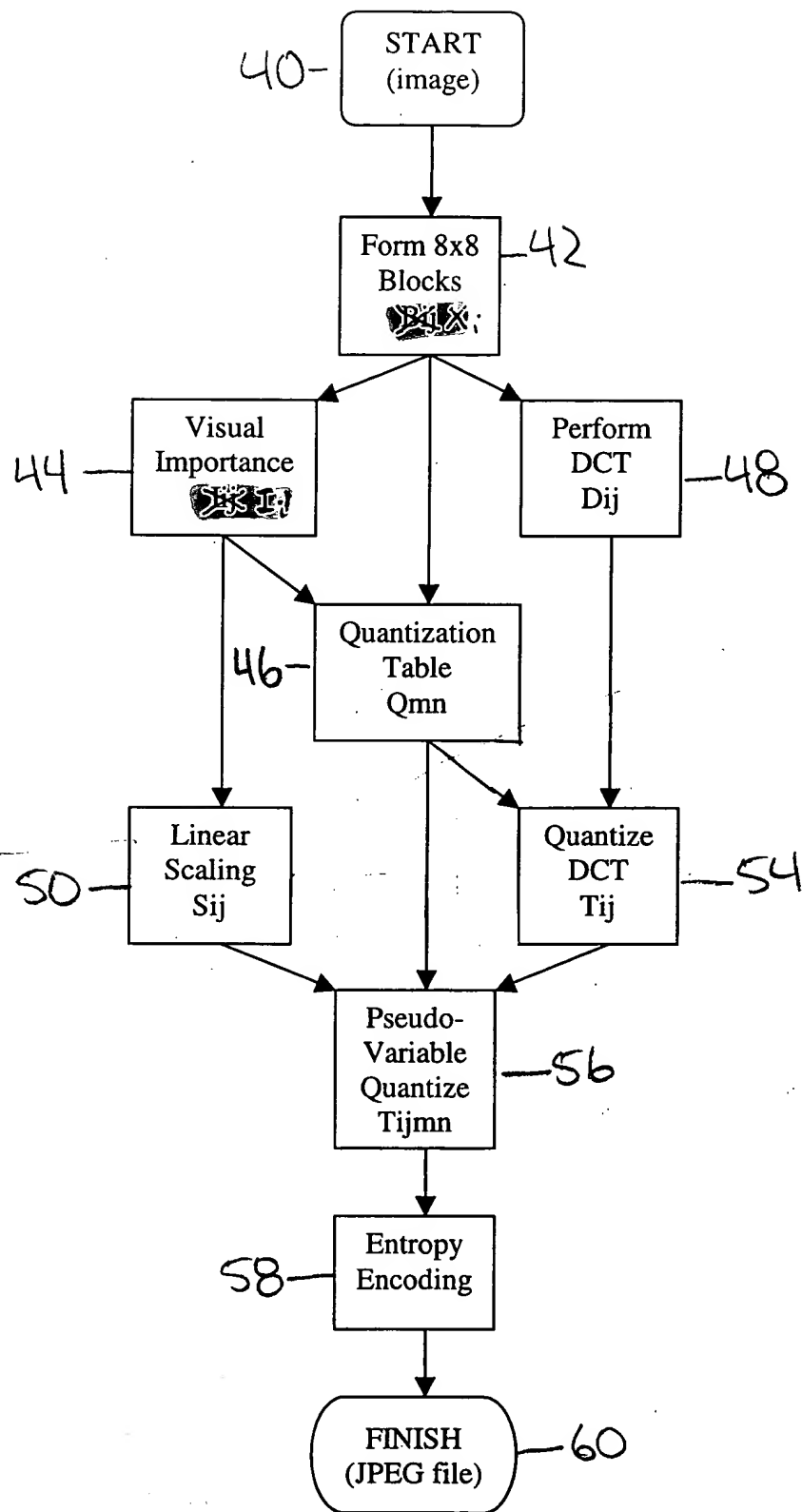
Form 8x8 Blocks Bij x —42

Visual Importance Iij

44—

Perform DCT Dij —48

Quantization Table Qmn

46—

Linear Scaling Sij

50—

Quantize DCT Tij —54

Pseudo-Variable Quantize Tijmn —56

Entropy Encoding

58—

FINISH (JPEG file) —60

Figure 2

START

Fig. 3

FRAME — 80

X_j
X_i

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I_i 87

88 — $\sum_{2i} I_{iy} \frac{Y_i[m,n]}{B_{xy}mn}$

86 — Visual Importance Calculator

82 — DCT TRANSFORMER

$Y_i[m,n]$

$A[m,n]$ — 100

MEMORY — 84

124 — Set S_{ij}min

MEMORY

126 — Set S_{ij}max

102 — MAX $A[m,n]$ Selector

128 — Calculator — 89

I_{iy}

104 — MAX A_{mn} A_{mn}

130 — store Qstd

S_{ij}
$I_{iy}(S_{ijmax} - S_{ijmin}) + S_{ijmax}$
$D_{ijmn} Y_i[m,n]$

116 — $abs(D_{ijmn}) - (2^{ceil(lg(absD_{ijmn}+1)-1)} - 1)$

$B[m,n]$
129 — Q_{mn} — S_{ijmin}

Calc S such that (sB - Qstd is a min)

round $\frac{D_{ijmn} Y_i[m,n]}{S_{ijmin} \cdot Q_{mn}} = T_i[m,n]$

118 — $abs(D_{ijmn}) - Q_{mn} * S_{ij} * round(D_{ijmn} / (S_{ij} * Q_{mn}))$

$T_{ijmn}[m,n]$ 106

132 — Is $T_i[ ] > 0$? No

COMPARATOR — 108

120 — Calculator

$T_{ijmn} > 0$

134 — Is $Ernd.[m,n] \leq Evg_i[m,n]$? No

122 — Set $T_{ijmn} = sign(D_{ijmn}) * (2^{ceil(lg(absD_{ijmn})+1)-1} - 1)$

131 — Calc sB - Q

round $\frac{Y_i[m,n] D_{ijmn}}{S_{ij} * Q_{mn}}$ — 110

$= 0$ $\neq 0$

SET $T_{ijmn} = 0$ — 112

Yes 138 — set $T_i[m,n] = sign(T_i[m,n]) Pabs(T_i[m,n])$

ENTROPY ENCODER — 113

91